Laboratory Equipment Manufacturer
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User manual
Digital Heating Mantle
K-5

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General Remarks:

- **Never turn on the heating mantle without Kolbe**
- Put only glass Kolbe on the heating mantle that fit the heating mantle's volume
- Never put Beaker or Erlenmeyer or anything else that not Kolbe
- Don't spill any liquids into the heating mantle
- Always replace the fuse from the same type & current
- The liquid's level inside the Kolbe must be above the heating mantle
- Always put a **glass** Kolbe in the heating mantle

IMPORTANT SAFETY INSTRUCTIONS

WARNING

1. The Kolbe should match the size of the heating mantle exactly, it needs good heat conductor between the vessel & mantle.
2. The Kolbe should be clean, bad conductor can make the Kolbe burst.
3. The mantle has to be operated with Kolbe inside the mantle
4. The Kolbe has to be with liquid inside.
5. The Kolbe must be resistant the respective operating temperature
6. Keep the heating mantle dry. Even small quantities of liquids can destroy the heating elements.
7. Do not heat any substances above temperature which will cause hazards of explosion, implosion or release of toxic or flammable gases arising from the materials being heated.
8. Do not use in the presence of flammable or combustible materials or explosive gases.
9. Do not use in the presence of pressurized or sealed containers. Fire or explosion may result, causing severe injury or death.
10. To avoid electrical shock, always use a properly grounded electrical outlet of correct voltage and current handling capacity.
11. The user has the responsibility for carrying out appropriate decontamination, if hazardous material is split on or inside the equipment.
12. The user shall be aware that, if the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
13. The instrument should be placed so, that handy operation of the ON-OFF power switch is possible, and that the mantle power cable can be disconnected from the main in case of risk.

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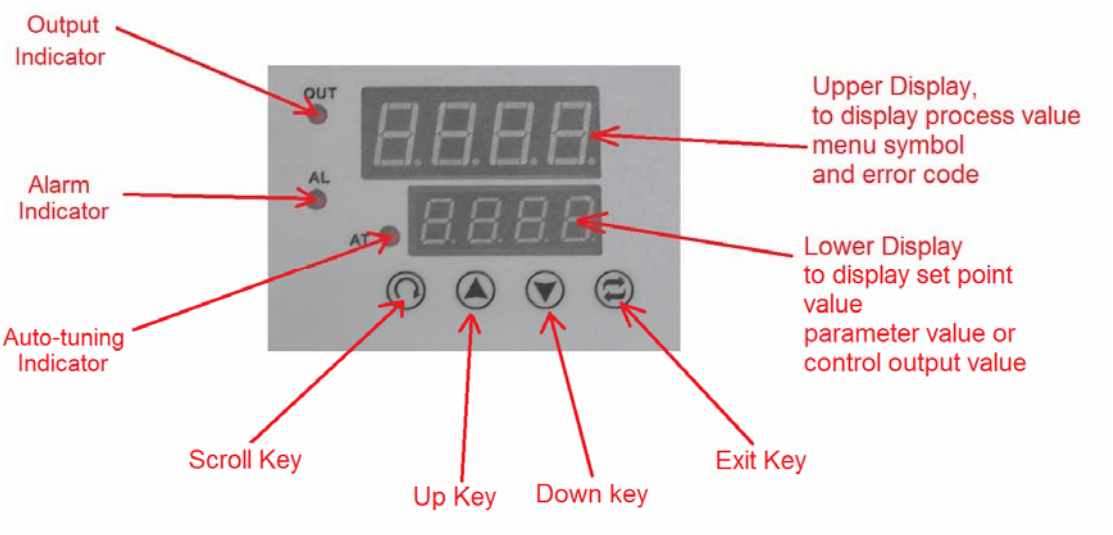
Operation instruction:

Digital controller:



1. **Put Kolbe with liquid** inside the heating mantle.
2. Connect the instrument to a ground mains outlet, after ensuring that the Voltage is the same as given on the sticker. The mantle must be connected to an earthen (grounded) supply.
3. Connect the external temperature sensor to the back of the instrument and put it in the Kolbe (verify the correct polarity of the sensor's plug)
4. Turn on the instrument from the ON/OFF switch at the back of the instrument.
5. Press on the "Up Key" and enter your temperature set point
6. The OUT indicator will lit and the heating process will start

Remarks: Don’t change parameters on the controller except from your temperature set point

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Auto-tuning

The auto-tuning process is performed at set point.
The process will oscillate around the set point during tuning process. Set a set point to a lower value if overshooting beyond the normal process value is likely to cause damage.
The auto-tuning is applied in cases of:

- Initial setup for a new process
- The set point is changed substantially from the previous auto-tuning value
- The control result is unsatisfactory

Operation :

1. Verify that the LOCK parameter is NONE.
2. To verify this, press and hold the "SCROLL KEY" until SET appears on the display.
3. Press on the "SCROLL KEY" once and change the LOCK value to NONE with the "UP KEY"
4. Press once on the "EXIT KEY"
5. Enter your temperature setpoint with the "UP KEY"
6. Press and hold the "SCROLL KEY" until "A-T" appears on the display.
7. Press again for at least 5 seconds on the SCROLL KEY , The AT indicator will begin to flash and the auto-tuning procedure is beginning.
8. Wait until the end of the auto-tuning procedure

Procedures:
After the auto-tuning procedures are completed, the AT indicator will cease to flash and the unit revert to PID control by using its new PID values. The PID values obtained are stored in the nonvolatile memory.

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